μA709C

HIGH PERFORMANCE OPERATIONAL AMPLIFIER

FAIRCHILD LINEAR INTEGRATED CIRCUITS

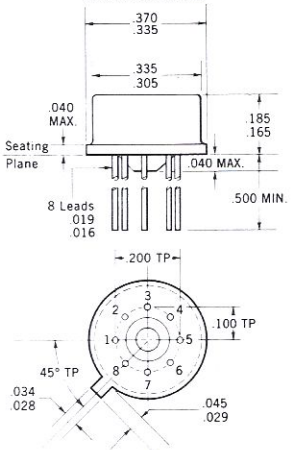
GENERAL DESCRIPTION - The μA709C is a high-gain operational amplifier constructed on a single silicon chip using the Fairchild Planar epitaxial process. It features low offset, high input impedance, large input common mode range, high output swing under load and low power consumption. The device displays exceptional temperature stability and will operate over a wide range of supply voltages with little degradation of performance. The amplifier is intended for use in DC servo systems, high impedance analog computers, in low-level instrumentation applications and for the generation of special linear and nonlinear transfer functions. For full temperature range operation (-55°C to +125°C) see μA709 or μA709A data sheet.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage		± 18 V
Internal Power Dissipation	(Note 1)	250 mW
Differential Input Voltage		± 5.0 V
Input Voltage		± 10 V
Output Short-Circuit Duration	(T_A = 25°C)	5 sec
Storage Temperature Range		-65°C to +150°C
Operating Temperature Range		0°C to +70°C
Lead Temperature (Soldering, 60 sec)		300°C

PHYSICAL DIMENSIONS

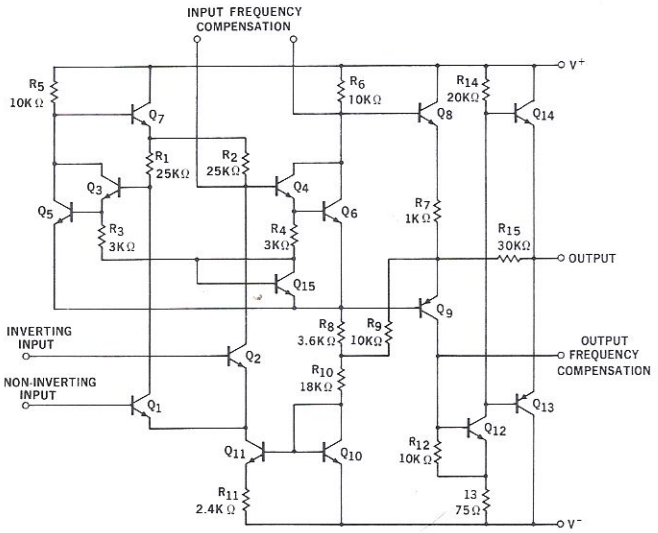
in accordance with JEDEC(TO-99) outline



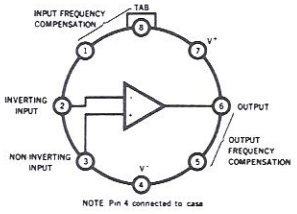
NOTES: Dimensions as per latest JEDEC committee
All dimensions in inches
Leads are gold plated Kovar
Package weight is 1.22 grams

ORDER PART NO.
U5B770939X

SCHEMATIC DIAGRAM



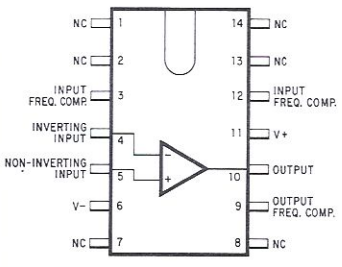
CONNECTION DIAGRAM



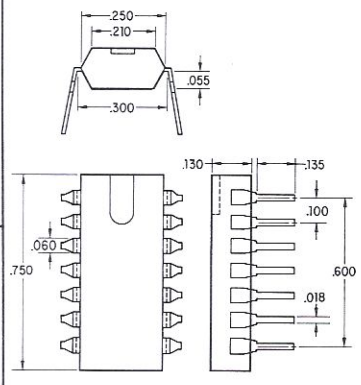
NOTE Pin 4 connected to case

(Top View)

CONNECTION DIAGRAM



PHYSICAL DIMENSIONS



NOTES: All dimensions in inches
Leads are intended for insertion in hole rows, .300 centers

ORDER PART NO.
U6E770939J

NOTE 1: Rating applies for ambient temperatures to +70°C.

313 FAIRCHILD DRIVE, MOUNTAIN VIEW, CALIFORNIA, (415) 962-5011, TWX: 910-379-6435

FAIRCHILD SEMICONDUCTOR
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

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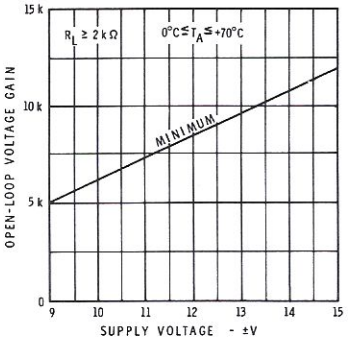
MANUFACTURED UNDER ONE OR MORE OF THE FOLLOWING U. S. PATENTS: 291877, 3015048, 3025589, 3064167, 3108359, 3117260; OTHER PATENTS PENDING.

ELECTRICAL CHARACTERISTICS ($V_S = \pm 15\,V$, $T_A = 25°C$ unless otherwise specified)

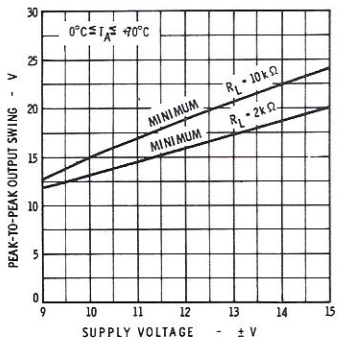
Parameter	Conditions	Min.	Typ.	Max.	Units
Input Offset Voltage	$R_S \leq 10\,k\Omega$, $\pm 9\,V \leq V_S \leq \pm 15\,V$		2.0	7.5	mV
Input Offset Current			100	500	nA
Input Bias Current			0.3	1.5	μA
Input Resistance		50	250		kΩ
Output Resistance			150		Ω
Large-Signal Voltage Gain	$R_L \geq 2\,k\Omega$, $V_{out} = \pm 10\,V$	15,000	45,000		
Output Voltage Swing	$R_L \geq 10\,k\Omega$	±12	±14		V
	$R_L \geq 2\,k\Omega$	±10	±13		V
Input Voltage Range		±8.0	±10		V
Common Mode Rejection Ratio	$R_S \leq 10\,k\Omega$	65	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 10\,k\Omega$		25	200	μV/V
Power Consumption			80	200	mW
Transient Response	$V_{in} = 20\,mV$, $R_L = 2\,k\Omega$,				
Risetime	$C_1 = 5000\,pF$, $R_1 = 1.5\,k\Omega$, $C_2 = 200\,pF$, $R_2 = 50\,\Omega$		0.3		μs
Overshoot	$C_L \leq 100\,pF$		10		%
The following specifications apply for $0°C \leq T_A \leq +70°C$					
Input Offset Voltage	$R_S \leq 10k\Omega$, $\pm 9\,V \leq \pm 15\,V$			10	mV
Input Offset Current				750	nA
Input Bias Current				2.0	μA
Large-Signal Voltage Gain	$R_L \geq 2k\Omega$, $V_{out} = \pm 10\,V$	12,000			
Input Resistance		35			kΩ

GUARANTEED ELECTRICAL CHARACTERISTICS

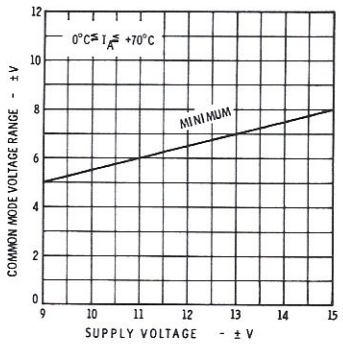
VOLTAGE GAIN



OUTPUT VOLTAGE SWING

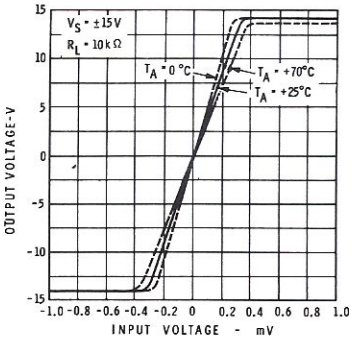


INPUT COMMON MODE VOLTAGE RANGE

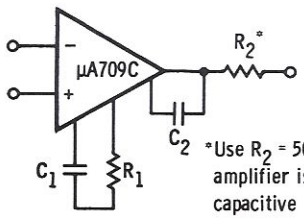


TYPICAL PERFORMANCE CURVES

VOLTAGE TRANSFER CHARACTERISTIC

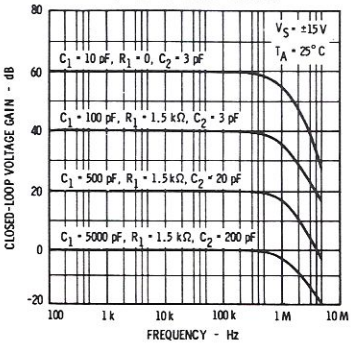


FREQUENCY COMPENSATION CIRCUIT



*Use $R_2 = 50\,\Omega$ when the amplifier is operated with capacitive loading.

FREQUENCY RESPONSE FOR VARIOUS CLOSED-LOOP GAINS


80
60
40
20
0
-20
CLOSED-LOOP VOLTAGE GAIN - dB
$V_S = \pm 15V$
$T_A = 25°C$
$C_1 = 10\,pF$, $R_1 = 0$, $C_2 = 3\,pF$
$C_1 = 100\,pF$, $R_1 = 1.5\,k\Omega$, $C_2 = 3\,pF$
$C_1 = 500\,pF$, $R_1 = 1.5\,k\Omega$, $C_2 = 20\,pF$
$C_1 = 5000\,pF$, $R_1 = 1.5\,k\Omega$, $C_2 = 200\,pF$
100 1k 10k 100k 1M 10M
FREQUENCY - Hz

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